

# Mitos Duo XS-Pump

## Part No. 3200057



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## Description

The MitoS Duo XS-Pump (Part No. 3200057) is a versatile microfluidic pumping solution. It can be configured into 2 refilling flows or 1 continuous flow. It is operated using an intuitive twist and click knob and display or by a PC using free software. A choice of flow modes allows simple or complex flow control.



**Left:** MitoS Duo XS-Pump (Part No. 3200057).

**Above:** User replaceable syringes allow wide flow rate range. Part numbers are given on Page 7.

## Benefits

- Versatile with many modes of operation
- Advanced drive electronics
- Easy to use
- Small footprint
- Extra smooth pumping eliminates pulsation issues
- Wide temperature / pressure range
- Wide flow rate range - syringes are easily replaceable
- Excellent chemical compatibility

## Specifications

Pump Specification	Value
Number of channels	2 refilling or 1 continuous
Number of input streams	1 - 10
Number of output streams	1 - 10
Flow rate range	0.1µl/min - 30ml/min
Operating pressure range	0 - 6Bar (0 - 90PSI)
Size (height x width x depth)	260mm x 160mm x 250mm
Wetted materials	Glass, PTFE and PCTFE

## Mitos Duo XS-Pump Flow Rates

The Mitos Duo XS-Pump allows flow rates in both dual and continuous mode.

### Dual Mode

Syringe Size (µl)	Min Syringe Speed (µl/min)	Max Syringe Speed (µl/min).
50	0.1	300
100	0.2	600
250	0.5	1500
500	1	3000
1000	2	6000
2500	5	15000
5000	10	30000

## Continuous Mode

Syringe Size ( $\mu\text{l}$ )	Min Syringe Speed ( $\mu\text{l}/\text{min}$ )	Max Syringe Speed ( $\mu\text{l}/\text{min}$ ).
50	0.1	176
100	0.2	352
250	0.5	882
500	1	1764
1000	2	3529
2500	5	8820
5000	10	17647

The max syringe speed in continuous mode takes into account an estimated valve switching time on the fill stroke of a syringe.

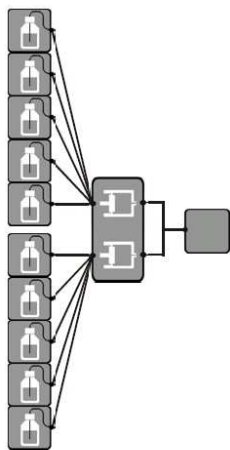
## User Interface and Control

The Mitos Duo XS-Pump can be used on its own with the twist and click control knob and large display. Automated liquid reagent addition may be carried out by setting dispense volume or flow rate over a time period. It is also possible to generate advanced flow rate profiles.

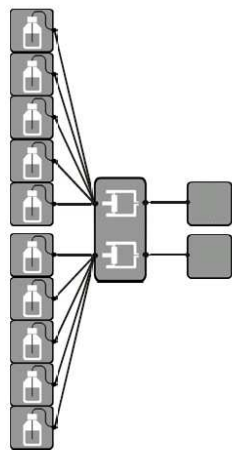


## Modes of Operation

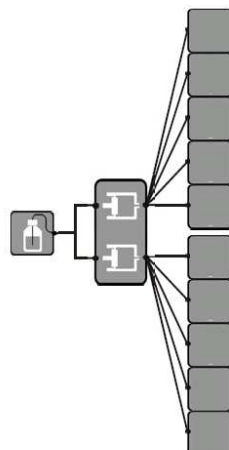
The pump has two syringes and two multi-port valves allowing it to be configured in a number of ways. As each port can be used to aspirate from or dispense to, the pump can be used as “one to many”, “many to one” or one continuous flow. The various configuration options using a 6-port valve are shown below:



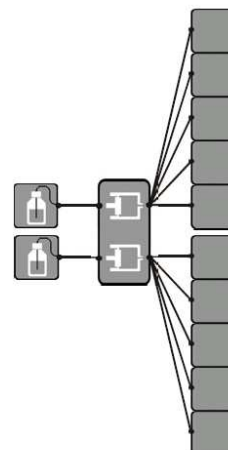
10 liquid reagents to 1 microfluidic device



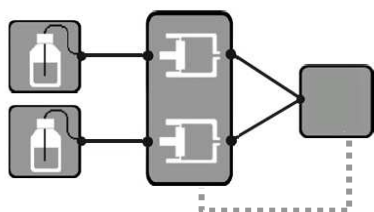
10 liquid reagents to 2 microfluidic devices



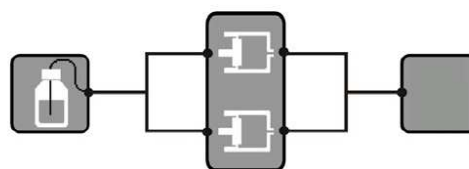
1 liquid reagent to 10 microfluidic devices



2 liquid reagents to 10 microfluidic devices



Mixing reagents with feedback control

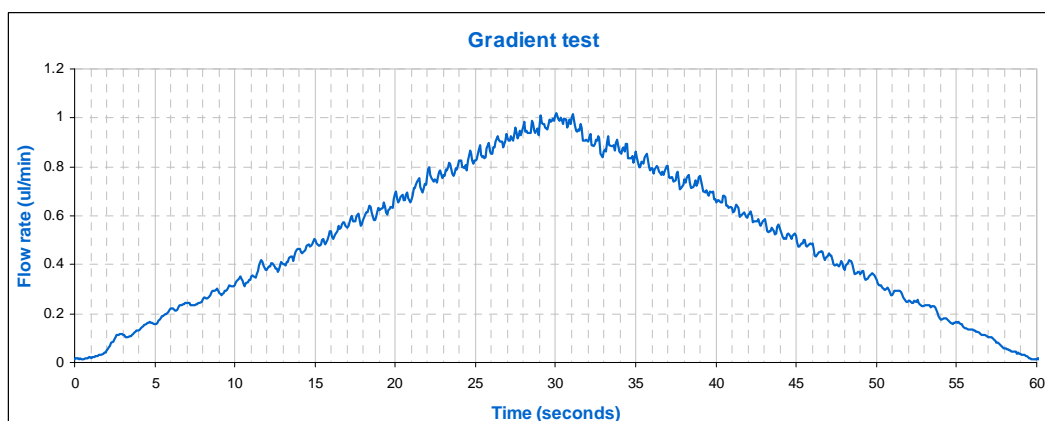
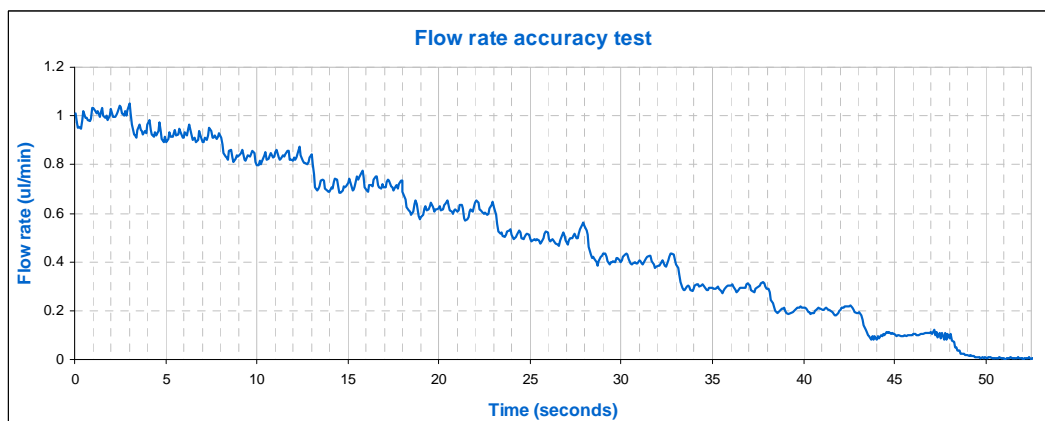
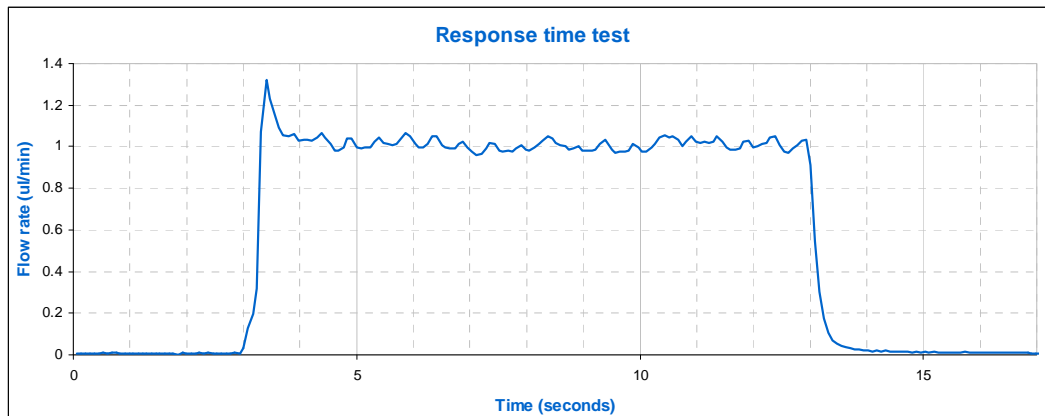


Continuous reagent addition

## Extra Smooth Pumping

The Mitos Duo XS-Pump uses advanced electronics to remove the pulsation from the stepper motor drive, providing pulse-free flow. This is required for microfluidic applications where pulsation from the stepper motor can affect performance.

The graphs below show the flow performance that can be obtained using the Duo XS-Pump with a 12.5 $\mu$ l glass syringe.



*Notes: The graphs show flow rate (raw data) measured using a thermal anemometer sensor. Prior to the tests some optimisation was carried out to match the response of the pump to the fluidic system.*

## Application examples

1. Droplet generation in a microfluidic chip. In this application one channel pumped oil and the other channel pumped water into a microfluidic chip. A T-junction was used to produce a stream of 100 micron diameter droplets.
2. Surface modification of microfluidic devices. In this application a pump channel was connected to a microfluidic device and series of reagents were pumped through the device. The flow rates and residence times were adjusted to optimise the surface modification procedure.

## Mitos Duo XS-Pump Basic



The Mitos Duo-XS Pump Basic (Part No. 3200066) is operated via free PC software or via your own software using the user API (it does not include a twist and click knob and display). All the other features on the pump are the same including extra smooth pumping, wide flow rate range and the various modes of operation.

## Contents

The pumps will be supplied with the following items:

- User manual
- 24V Power supply
- Decontamination Certificate

**Note:** 2 Valves and 2 syringes will be required from the Parts and Accessories list to use the pump.

## Mitos Duo XS-Pump Basic Flow Rates

The Mitos Duo XS-Pump Basic allows flow rates in dual mode.

### Dual Mode

Syringe Size ( $\mu\text{l}$ )	Min Syringe Speed ( $\mu\text{l}/\text{min}$ )	Max Syringe Speed ( $\mu\text{l}/\text{min}$ ).
50	0.1	300
100	0.2	600
250	0.5	1500
500	1	3000
1000	2	6000
2500	5	15000
5000	10	30000

### Continuous Mode

The Mitos Duo XS-Pump Basic can support continuous flow if user programs this mode via the user software with the user API provided.

## Parts and Accessories

Various valves are available depending on the number of inputs and outputs required. Dolomite offers the following accessories to be used with the Mitos Duo XS-Pump and Mitos Duo XS-Pump Basic:



4-Port Valve

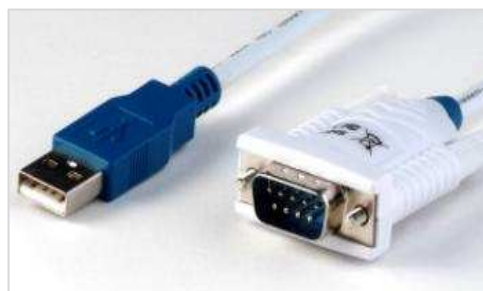


Two user replaceable syringes





The Mitos XS-Pump Starter Kit



USB to RS232 Adaptor Cable

Description	Specification	Part No.
2 Port Valve (PTFE/PCTFE)	Max. Pressure = 6bar	3000244
3 Port Valve (PTFE/PCTFE)	Max. Pressure = 6bar	3000245
4 Port Valve (PTFE/PCTFE)	Max. Pressure = 6bar	3000246
6 Port Valve (PTFE/PCTFE)	Max. Pressure = 6bar	3000247
Syringe for Mitos Duo XS-Pump - 50µl	Typical flow rates: 0.1µl/min to 300µl/min	3000248
Syringe for Mitos Duo XS-Pump - 100µl	Typical flow rates: 0.2µl/min to 600µl/min	3000249
Syringe for Mitos Duo XS-Pump - 250µl	Typical flow rates: 0.5µl/min to 1500µl/min	3000250
Syringe for Mitos Duo XS-Pump - 500µl	Typical flow rates: 1µl/min to 3ml/min	3000251
Syringe for Mitos Duo XS-Pump - 1ml	Typical flow rates: 2µl/min to 6ml/min	3000252
Syringe for Mitos Duo XS-Pump - 2.5ml	Typical flow rates: 5µl/min to 15ml/min	3000253
Syringe for Mitos Duo XS-Pump - 5ml	Typical flow rates: 10µl/min to 30ml/min	3000254
The Mitos XS-Pump Starter Kit	Contains a selection of tubing and fittings to enable fluidic connections between a Mitos XS-Pump and a microfluidic system.	3000335
Krytox GPL 205 Fluorinated Grease	Available in 0.5oz, this Fluorinated Grease is ideal for lubricating the syringes used with the syringe pumps. This is required when pumping some organic liquids, in particular hydrocarbons and chlorinated hydrocarbons.	3200163
USB to RS232 Adaptor Cable	Connection to a PC	3200197

*Note that the pump is not limited to the typical flow rates. At the lower end of the flow rate range flow stability is reduced and the use of a smaller syringe size is recommended.*



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